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TECHNICAL MEMORANDUM

December 1, 1964

To: R. J. Lofthouse
 From: Paul D. Hess
 Subject: Instrumentation Subsystem Development Plan
 Activity 180
 Distribution: J. L. Platner, D. L. Gagne, R. E. Loehen, J. R. Hurley,
 J. E. Ward, C. Martin, G. Johnson

1. ASSIGNMENT

The individual to whom this memorandum is directed is assigned the design effort responsibility of evolving the design specification drawing (s), and/or functional diagrams of the subject subsystem (Activity 180-375). In conjunction with this and other critical component areas continuous surveillance must be maintained so that recommendations can be made at the earliest possible dates, where requests for GFE back-ups are essential.

In addition, the tests planned or evolved, which will follow the path from Event 180 through 405 on to 580, shall be performed and reported on along with periodic subsystem design reviews. A concerted attempt should be made to meet all dates set forth in the Part III Pert Program Plan.

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INSTRUMENTATION SUBSYSTEM

2. Function

The Instrumentation Subsystem (IS) will include the transducers, special sensors and instrumentation necessary to measure the performance characteristics of the PCPS and will be integrated into the FCA & EMCS. The readout equipment will be accomplished partially by the EMCS and the remaining by laboratory facilities.

3. Status

The following is an outline of special sensors and detectors and other performance parameter outputs to be provided by IS.

A. FCA Voltage

Each individual cell voltage & total voltage will be terminated in either a potted connector or an environmental (E Type) connector to prevent electrical leakage in the event moisture collects in the connector. Two connectors will be provided.

B. Current Output

A shunt will be provided to measure current and have a rating of 100 MV/100 Amps.

C. Temperature

Fe-Constantan thermocouples will be used and terminated in either a thermocouple connector or conax Con-o-clad sealant gland.

D. Inverter

Input & Output current will be monitored using shunts. Output voltage will also be monitored

E. Pressures

The following pressure transducers, potentiometer type, will be supplied.

1. H ₂ -input	0-50 psia	0.02 v/v/psi
2. O ₂ -input	0-50 psia	0.02 v/v/psi
3. H ₂ O cavity - monitor	0-25 psia	0.04 v/v/psi
4. Canister pressure	0-50 psia	0.02 v/v/psi
5. H ₂ -O ₂ differential pressure	10-0-10 psi	0.1 v/v/psi
6. H ₂ O recovery cond. vapor pressure	0-5 psia	0.2 v/v/psi
7. Coolant pressure-inlet	0-50 psia	0.02 v/v/psi
8. In-out coolant differential pressure	0-10 psia	0.1 v/v/psi

F. Vibration

A microminiature triaxial accelerometer will be mounted on the outside of the bottom end plate to measure vibrations along the x, y & z axis of FCA.

G. Fan RPM

Fan speed will be measured using a magnetic pickup device. A ferro-magnetic material will be located on the fan rotor and will generate a voltage each time it passes the magnetic pickup.

H. Valve and Relay Positions

Extra contracts will be provided on all valves and relays to indicate their state or condition.

4. Development Areas

The development areas of the P will be to select or develop hermetically sealed connector, thermocouples, voltage, transistor

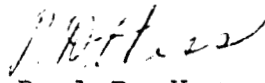
leads and fan power. Solder type connectors will be investigated which will be soldered to a heavier flange for better sealing.

An RPM readout device will be developed utilizing a magnetic pickup. The development will require laboratory testing to determine proper location of pickup with respect to fan. Specifications will be developed for all components.

5. Test Plan

Test Authorization Specifications will be written for components and any special verification tests required to verify design concepts.

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